Fowler

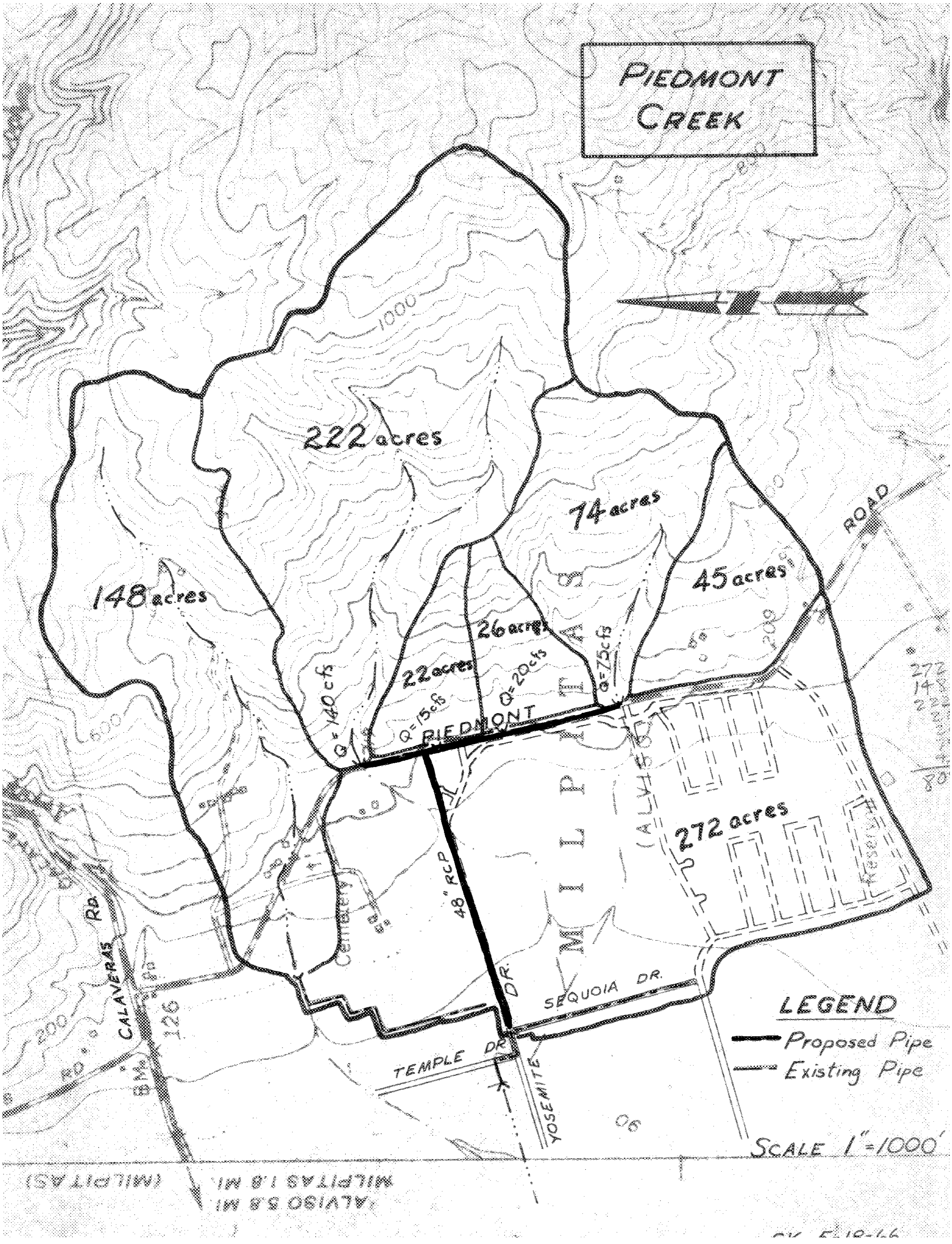
SANTA CLARA COUNTY FLOOD CONTROL
AND
WATER DISTRICT

REPORT
ON
PROPOSED CHANNEL IMPROVEMENTS
ON
PIEDMONT CREEK

ZONE E-1 PROJECT NUMBER 40031

JUNE, 1968

TC
425
P53.R4
1968
REF


PIEDMONT CREEK
222 acres
148 acres
74 acres
45 acres
26 acres
22 acres
272 acres
Q=140 cfs
Q=15 cfs
Q=20 cfs
Q=75 cfs
1000
600
200
209
PIEDMONT
ROAD
48" RCP
MILPITAS
ALVISO
Cemetery
Reservoir
SEQUOIA DR.
TEMPLE DR.
YOSEMITE DR.
CALAVERAS RD.
126
BM
LEGEND
Proposed Pipe
Existing Pipe
SCALE 1"=1000'
SK 5-18-66

P-1

SANTA CLARA COUNTY FLOOD CONTROL AND WATER DISTRICT, San Jose, California

By C. KUNTZ Date 5-18-66 Chkd. By ______ Date ______ Sheet No. 1 of 3

Subject ______ Job No. ______

COST ESTIMATE FOR PIEDMONT CREEK

From Sequoia Road to Piedmont Road

CONSTRUCTION COSTS

	Item	Amount	Unit Cost	Total
1	42" dia conc. pipe	150'	$17	$ 2,550
2	48" dia conc. pipe	2250'	$20	45,000
3	60" dia conc. pipe	220'	$29	6,380
4.	Manholes	3	600	1 800
5.				
6.				

Total Construction Estimate	55,730
Contingencies & Engineering	11,150
Total Construction Cost	$ 66,880

OTHER INSTALLATION COSTS

1.	Land Purchase ______ Acres	
2.	Relocation of Utilities	
3		
4.		

Page 2 Subtotal $ 58,490

TOTAL INSTALLATION COST $ 125,400

P-1 SANTA CLARA COUNTY FLOOD CONTROL AND WATER DISTRICT, San Jose, California

By C. KUNTZ Date 5-18-66 Chkd. By ________ Date ________ Sheet No. 2 of 3

Subject ________ Job No. ________

COST ESTIMATE FOR PIEDMONT CREEK

Collecting pipes along Piedmont Road

CONSTRUCTION COSTS

Item	Amount	Unit Cost	Total
1. 18" dia. conc. pipe	100'	#8	$ 800
2. 33" dia. conc. pipe	1010'	#14	14,140
3. 36" dia. conc. pipe	650	#15	9,750
4. 42" dia. conc. pipe	600	#17	10,200
5. Intake structure	4	750	3,000
6. Pavement removal & replacement	1320 yd²	6.40	8,450
7. Manhole	4	600	2,400
Total Construction Estimate			48,740
Contingencies & Engineering			9,750
Total Construction Cost			$ 58,490

OTHER INSTALLATION COSTS

1. Land Purchase ______ Acres	
2. Relocation of Utilities	
3. ________	
4. ________	
Subtotal	$

TOTAL INSTALLATION COST $ ________

TC425P53R41968c.3

SANTA CLARA COUNTY FLOOD CONTROL

AND

WATER DISTRICT

REPORT

ON

PROPOSED CHANNEL IMPROVEMENTS

ON

PIEDMONT CREEK

ZONE E-1 PROJECT NUMBER 40031

JUNE, 1968

SANTA CLARA COUNTY FLOOD CONTROL
AND
WATER DISTRICT

BOARD OF DIRECTORS

Robert T. Sapp, Chairman

Joe Chiri   Victor F. Corsiglia   Maurice Dullea

James J. Lenihan   R. Jack Sturla   Frank A. Wilcox

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A. R. Turturici

Donald K. Currlin
General Manager

This report was prepared under the direction of
Lloyd C. Fowler, Director of Engineering

By

William M. Roman	Head, Planning Division
Malcolm E. Burns	Head, Flood Control Section
William Carlsen	Associate Civil Engineer

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santa clara county

FLOOD CONTROL AND WATER DISTRICT
DONALD K. CURRLIN GENERAL MANAGER

516 EAST MARTHA STREET
SAN JOSE, CALIF. 95112
DEPARTMENT OF ADMINISTRATION AND FINANCE 299-2031
CLERK OF THE BOARD 299-2031
ENGINEERING DEPT. 299-3841
PUBLIC SERVICE DEPT. 299-3841

June 25, 1968

Board of Directors
Santa Clara County Flood Control
and Water District
516 East Martha Street
San Jose, California

Gentlemen:

Transmitted herewith is the Engineers Report on Proposed Channel Improvements for Piedmont Creek, Project Number 40031 in Zone E-1 (East) of the Santa Clara County Flood Control and Water District.

The report describes 7,700 feet of proposed channel improvements consisting of earth channel sections, reinforced concrete lined channel, culverts, drop structures, and reinforced concrete pipe. The proposed improvements will prevent flood damage to the urban development existing and projected in the flood plain of Piedmont Creek from floods not exceeding the design flow.

The estimated cost to the District for these improvements is $300,000. Some of the improvements will be constructed by the State Division of Highways in conjunction with the construction of Route 680 Freeway at no cost to the District.

I concur in the project as proposed and recommend that a public hearing on this proposed channel improvement be held as a prerequisite to the construction of the project.

Sincerely yours,

Donald K Currlin

General Manager

INTRODUCTION

Piedmont Creek is in the East Zone of the Santa Clara County Flood Control and Water District. It originates in the foothills east of the City of Milpitas and flows westerly into the City to its outfall in Berryessa Creek.

Although Piedmont Creek has a relatively small (about 2 square miles) drainage area it has a high flood potential. The rapidly urbanizing area of Milpitas within the flood plain of Piedmont Creek required early improvement of this creek to eliminate potentially large flood damages. Since the District was not able to finance the early required work, a cooperative program of improvement was worked out with the City of Milpitas and the developer of Parktown, a major subdivision in the flood plain. This program was reviewed and recommended by the East Zone Flood Control Advisory Committee and approved by the District Board of Supervisors. The completed cooperative agreement provided that the developer would finance the required minimum flood control improvements; the District would construct these, and repay the developer the construction funds advanced when funds were available to the District.

This Engineers Report on the Proposed Channel Improvements on Piedmont Creek is a prerequisite to a Public Hearing on the project and to the repayment of the advanced construction funds. The report presents the results of a number of studies of the various alternatives analyzed before agreement was reached on the portion of Piedmont Creek that has been constructed and on the other reaches of the creek that remain to be improved before the project may be considered a completed flood prevention project. The report consists of:

1. A general description of the watershed and the problem with a map showing the location of the proposed project.
2. A discussion of the proposed project together with maps showing plans, profiles, typical cross sections and rights-of-way.
3. An estimate of the cost of the proposed project and suggested means for financing these costs.

DESCRIPTION OF WATERSHED

Piedmont Creek watershed is shown on Plate 2, a general map of the area. The creek originates in the hills southeasterly of Milpitas in the general vicinity of Piedmont Road and Calaveras Road at about elevation 1,200 feet. It flows westward from the hills through Milpitas to a confluence with Berryessa Creek, a distance of about 3 miles. The watershed area is 1.9 square miles and has an average annual precipitation of 15 inches.

At the present time (1968) the watershed in the hills is unincorporated territory and the downstream flood plain area is in Milpitas. These downstream gently sloping areas are presently in subdivisions or proposed subdivisions. The area west of Dempsey Road, a presently undeveloped industrial tract, drains directly into Berryessa Creek and although it is not a part of the watershed it is subject to flooding by overflow of Piedmont Creek.

The soils on the steeper portion of the watershed in the hills consist primarily of adobe-type clay and gravely clay-type soils while in the gently sloping areas of the downstream westerly part of the watershed the soil is predominantly clay-loam type. These soils have a relatively low permeability; therefore, the rate of runoff resulting from precipitation is high.

The native growth in the hills is mainly grass with some low growing brush and a few trees. This type of a vegetation has a small effect in reducing the runoff for low rainfall intensities but has little effect on the higher intensity rainfall which produces the design flows.

In computing the flood flows for the design of the creek improvements these characteristic factors of the watershed and the existing potential urban development of the entire watershed were considered.

DESIGN CRITERIA

The criteria used in the design of the Piedmont Creek flood control improvements followed accepted engineering standards. The hydraulic design of the channel considered the wave potential in relation to the velocity of flow in setting freeboard requirements. Conservative values of roughness (representing the friction along the channel banks and bottom) were used in the hydraulic design to allow for some deterioration in channel smoothness with time. Economic evaluation of alternative channel designs were based on estimates of construction, including engineering and inspection costs, right-of-way values, and the present worth of future maintenance costs.

The level of protection provided by the completed improvements was set by the District standard that the project be designed to safely convey a one percent flood (the so-called 100-year recurrence frequency flood) to a point of disposal. The design flood flows meeting this standard for Piedmont Creek were computed using runoff coefficients suitable to the characteristic of the watershed considering the potential urbanization. The time distribution of runoff from all areas was determined by the use of the Clark Unit Hydrograph Method. The resulting computed design flows at key locations are given in Table 1.

TABLE 1

PEAK FLOWS FOR DESIGN FLOOD

Piedmont Creek

Reach Number	Station	Location*	Watershed Area in Acres	Peak Flow in c.f.s.
14-15	77+10	340' W/o Piedmont Road	360	200
13	58+00	300' E/o Sequoia Drive	566	300
12	55+55	Sequoia Drive	808	425
7-11	51+00	W. Side Temple Drive	815	440
4-6	26+80	Park Victoria Drive	1055	550
1-3	15+80	W. Side of Freeway	1225	650
-	0+00	Confluence with Berryessa Creek		

*Design flows are for the upper or easterly end of each reach.

DESCRIPTION OF PROPOSED PROJECT

The proposed improvements to Piedmont Creek extend over a length of 7,700 feet upstream from its confluence with Berryessa Creek. The proposed improvements include earth channel sections, reinforced concrete lined channel, culverts, drop structures, and reinforced concrete pipe. The proposed improvements are illustrated in plan and profile on Plates 3 through 5.

At the confluence with Berryessa Creek a concrete confluence structure would be constructed in accordance with plans previously approved as part of the Berryessa Creek flood control improvement project. From the upstream side of the confluence structure a trapezoidal section earth channel would be installed extending easterly upstream to an energy dissipator at the westerly boundary of the proposed State Route 680 Freeway right-of-way.

Under the terms of an agreement approved by the District Board of Supervisors in September 1965, the State Division of Highways will construct a box culvert under the freeway, an energy dissipator, and the earth channel downstream to its confluence with Berryessa Creek. The District has agreed to accept maintenance responsibility for the portion of the channel outside of the State's right-of-way after completion of the channel by the State.

Upstream of the freeway the steeper natural slope requires a continuous concrete lining as the most economical type of erosion control installation that would provide for the design flood flows. Most of this vertical wall concrete-lined channel has already been installed with funds advanced by the developer of the Parktown Subdivision from Park Victoria Drive to Roswell Drive, including culverts at those streets and at Carnegie Drive.

The flood control facility upstream from Roswell Drive to the end of the project near Piedmont Road would be reinforced concrete pipe. The developer of the Parktown Subdivision advanced funds for the installation of about 2,250 feet of pipe completing the facility to a point in Yosemite Drive at Falcato Drive. The existing pipe is in an easement at the rear of lots from Roswell Drive to Temple Drive. A special type of high capacity inlet was installed on the pipeline at the westerly side of Temple Drive to accept the overflow from upstream local storm drains that were not designed to convey the 100-year flood flow. From Temple Drive upstream to the end of the project the design location for existing and future flood control pipelines is southerly in Temple Drive to Yosemite Drive then easterly in Yosemite Drive for the remaining reaches of the project.

The end of the project as presently proposed is located about 340 feet westerly of Piedmont Road where local storm drain pipelines which collect three tributaries of Piedmont Creek are proposed to form a confluence.

As part of the flood control project debris basins would be installed in the hills on the various branches of Piedmont Creek should they be found necessary to prevent siltation of the downstream flood control facilities. The location of these proposed facilities has not been delineated since it is unknown at this time if it will be necessary to install these facilities.

CONSTRUCTION STAGING

The flood control improvement project on Piedmont Creek divides easily into three construction stages. Stage 1 includes the existing channel improvements which have been installed with funds advanced by the developer of the Parktown Subdivision in Milpitas. This stage covers the reaches from Park Victoria Drive to a point in Yosemite Drive about 1,000 feet easterly of the Sequoia Drive intersection. The total construction costs of these completed improvements is $224,000 including engineering and inspection charges. Of this about $191,000 was advanced and this amount will be reimbursed without interest on or before May 1, 1970 in accordance with the District's agreement with the developer of Parktown.

Stage 2 will be the reach from Berryessa Creek to Dempsey Road which is to be constructed by the State Division of Highways at no cost to the District other than a small amount of engineering time required to coordinate this work with the other portions of the Piedmont Creek flood control facility.

Stage 3 would include the remaining improvements needed to complete the Piedmont Creek flood control project easterly of the future State Route 680 Freeway. Stage 3a would extend from the freeway easterly boundary to Park Victoria Drive and would be scheduled to be completed when the downstream portion of the channel under the freeway is completed. The cost of this portion of the project is estimated to be $46,000.

Stage 3b includes the pipelines which would extend easterly from the end of the existing pipe in Yosemite Drive to the upstream end of the project near Piedmont Road. Stage 3b improvements will be installed as development of the adjacent subdivision requires. The total cost of this improvement is estimated to be $30,000. Debris and sediment basins will in all probability be required at the upper terminal points of the pipe system and will be installed at the time these terminal points are fixed.

PROJECT COSTS AND FINANCING

Estimates of the cost of construction of the proposed flood control facility improvement to Piedmont Creek were made using prevailing 1968 prices. A contingency item was estimated to account for the costs of engineering, construction inspection, advertising, legal fees, and other incidentals. The estimated costs are presented in table 2.

TABLE 2

Estimated Costs of Project

Reach Nos.	Stage No.	Station Limits	Construction	Contingencies	Total
7-14	1	25+90 to 65+80	$179,000	$45,000	$224,000*
5	3a	19+20 to 25+90	37,000	9,000	46,000
15	3b	65+80 to 77+10	24,000	6,000	30,000
		Subtotal	$240,000	$60,000	$300,000
2-4**	2	0+40 to 19+20	(By State)		
	Total District Costs		$240,000	$60,000	$300,000

*Actual costs of completed improvements: about $191,000 has been advanced for reaches 7 thru 14 by A. J. Sassone, the Developer of the Parktown Subdivision.

**Reach 1 is a confluence structure, which is included in the Berryessa Creek Project.

As previously noted the lower reach of the project from Berryessa Creek to the easterly side of the future Route 680 Freeway will be installed and financed by the State Division of Highways. The developer of the Parktown Subdivision has advanced funds that financed Stage 1 noted in Table 2; reimbursement of this advance will be made in 1970. This repayment has been scheduled within the limits of the income in the East Zone by the East Zone Flood Control Advisory Committee so as not to require an increase in the current tax rate.

The remaining reaches of the Piedmont Creek flood control improvement project can be constructed and financed from current revenues in the East Zone without an increase in the current tax rate.

CONCLUSIONS AND RECOMMENDATIONS

As a result of the investigation of Piedmont Creek reported herein it is concluded that:

1) The unimproved channel of Piedmont Creek is inadequate to prevent flooding and damage to urban development now occurring in the flood plain of the creek.

2) The unimproved channel gradients are steep and are causing excessive erosion and consequent downstream silt deposition in the flood plain area.

3) Increasing development of the watershed will increase the flood damage potential both by increasing runoff and by placing additional urban development in the path of flood waters.

4) The most economical solution to the flood control problem would be to construct 1,500 feet of earth channel, 2,400 feet of vertical walled concrete-lined channel, 3,300 feet of pipeline, and 480 feet of culverts at road crossings.

5) The estimated construction costs including contingencies to be financed from District funds is $300,000. The portion of the project under the future State Route 680 Freeway will be constructed by the State Division of Highways at no cost to the District. Debris basins may be required, but they

are not shown on the plans as the upper end of the storm drain system has not as yet been determined.

6) By appropriate staging of construction and reimbursement of advanced funds the project can be completed within the existing tax rate of the East Zone.

Based on these conclusions it is recommended that the flood control improvements on Piedmont Creek as proposed herein be approved and construction initiated to complete the remaining reaches of the project.

Submitted:

Malcolm E. Burns

Malcolm E. Burns
Senior Hydraulic Engineer

Recommended Approval:

William M Roman

William M. Roman
Head Planning Division

Approved:

Lloyd C Fowler

Lloyd C. Fowler
Director of Engineering

MAP AND GENERAL PLAN

FOR

PIEDMONT CREEK

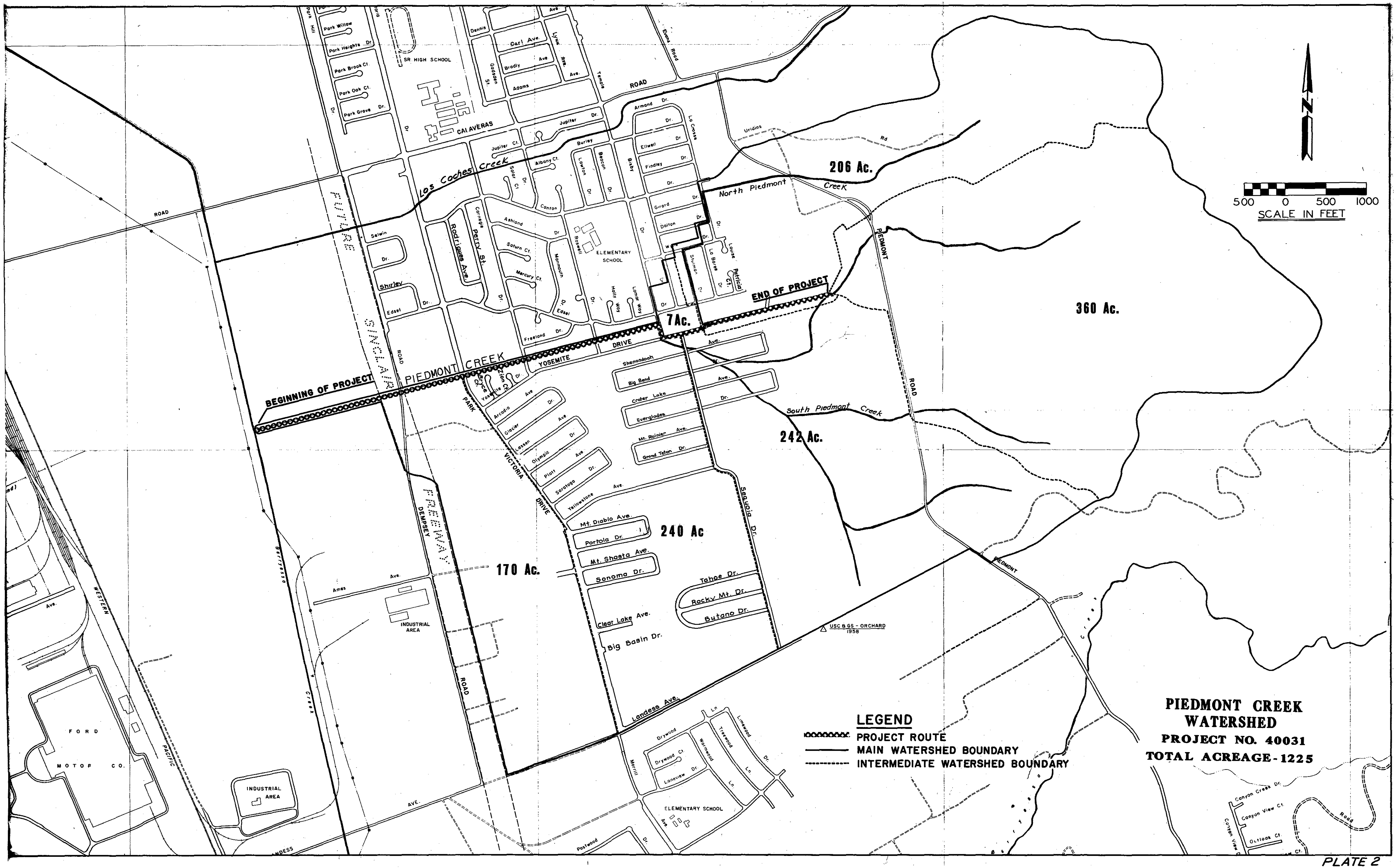
PROJECT NO. 40031 IN ZONE E-1 "EAST"

SANTA CLARA COUNTY FLOOD CONTROL
AND
WATER DISTRICT
CALIFORNIA

Project Approval:

Donald K Currlin
Manager Counsel
Date: 6/17/68

PLATE 1



LEGEND

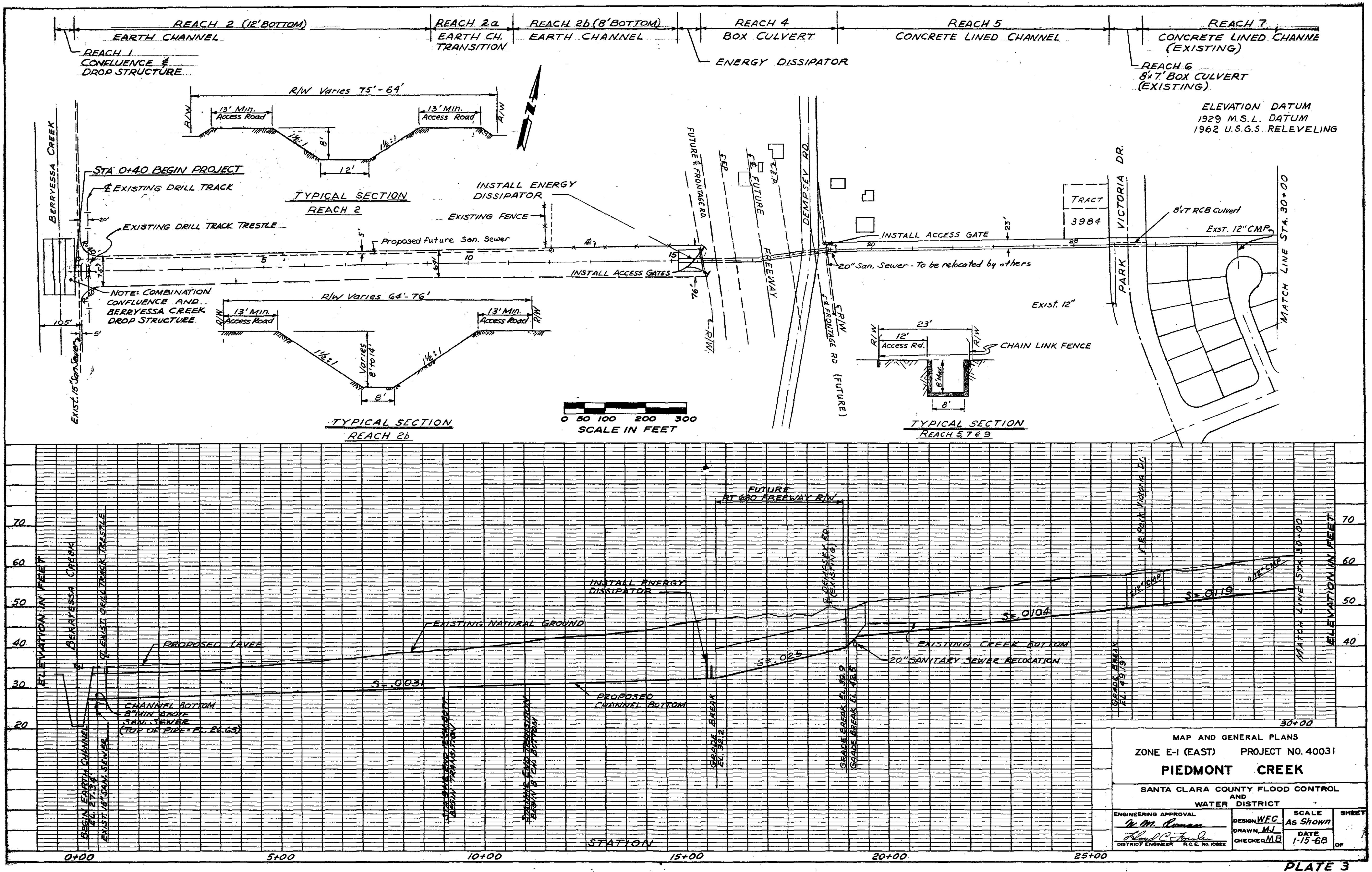
- xxxxxxx PROJECT ROUTE
- ——— MAIN WATERSHED BOUNDARY
- - - - - - INTERMEDIATE WATERSHED BOUNDARY

PIEDMONT CREEK WATERSHED

PROJECT NO. 40031

TOTAL ACREAGE-1225

PLATE 2



MAP AND GENERAL PLANS

ZONE E-1 (EAST) PROJECT NO. 40031

PIEDMONT CREEK

SANTA CLARA COUNTY FLOOD CONTROL
AND
WATER DISTRICT

ENGINEERING APPROVAL
W. M. Roman
Lloyd C. Fowler
DISTRICT ENGINEER R.C.E. No. 10822

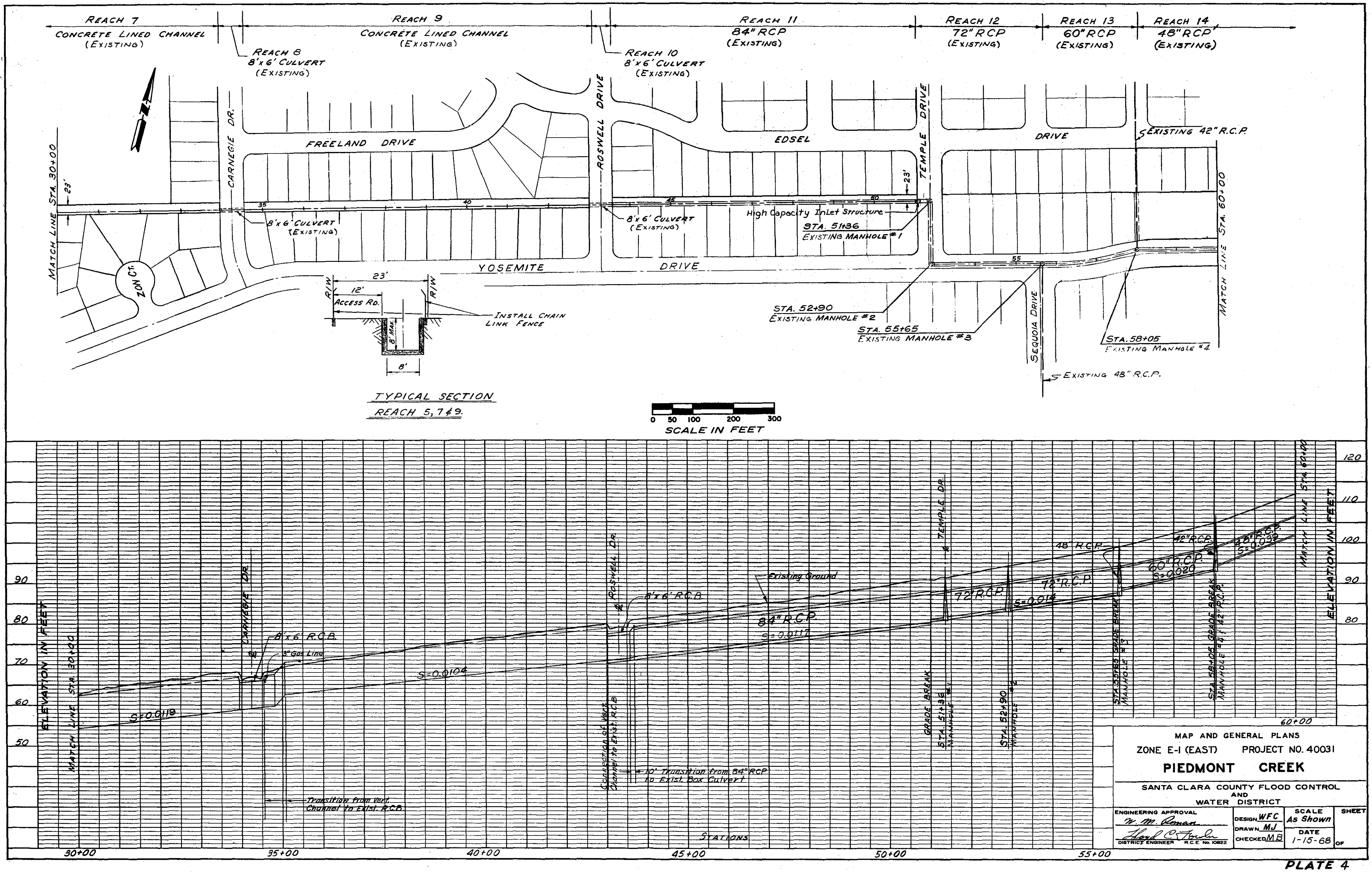
DESIGN WFC
DRAWN MJ
CHECKED MB

SCALE
As Shown

DATE
1-15-68

SHEET
OF

PLATE 3



MAP AND GENERAL PLANS

ZONE E-1 (EAST) PROJECT NO. 40031

PIEDMONT CREEK

SANTA CLARA COUNTY FLOOD CONTROL
AND
WATER DISTRICT

ENGINEERING APPROVAL
W. M. Roman
Lloyd C. Fowler
DISTRICT ENGINEER R.C.E. No. 10822

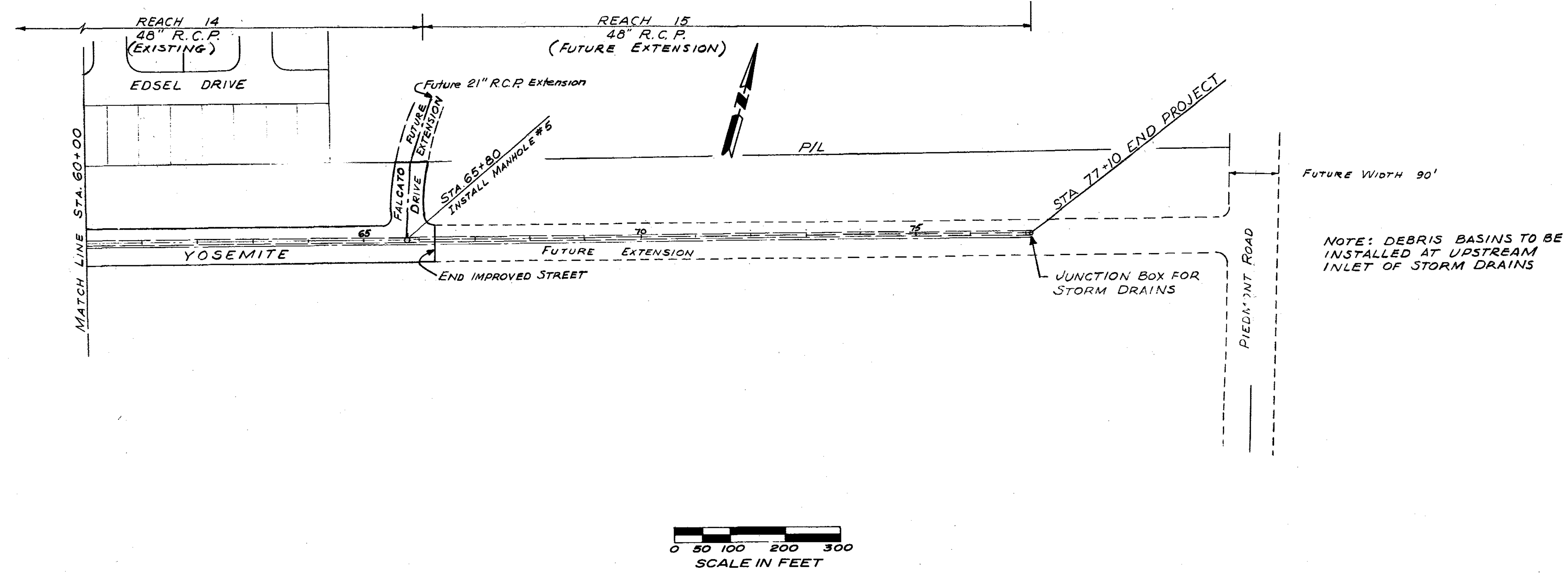
DESIGN WFC
DRAWN MJ
CHECKED MB

SCALE
As Shown

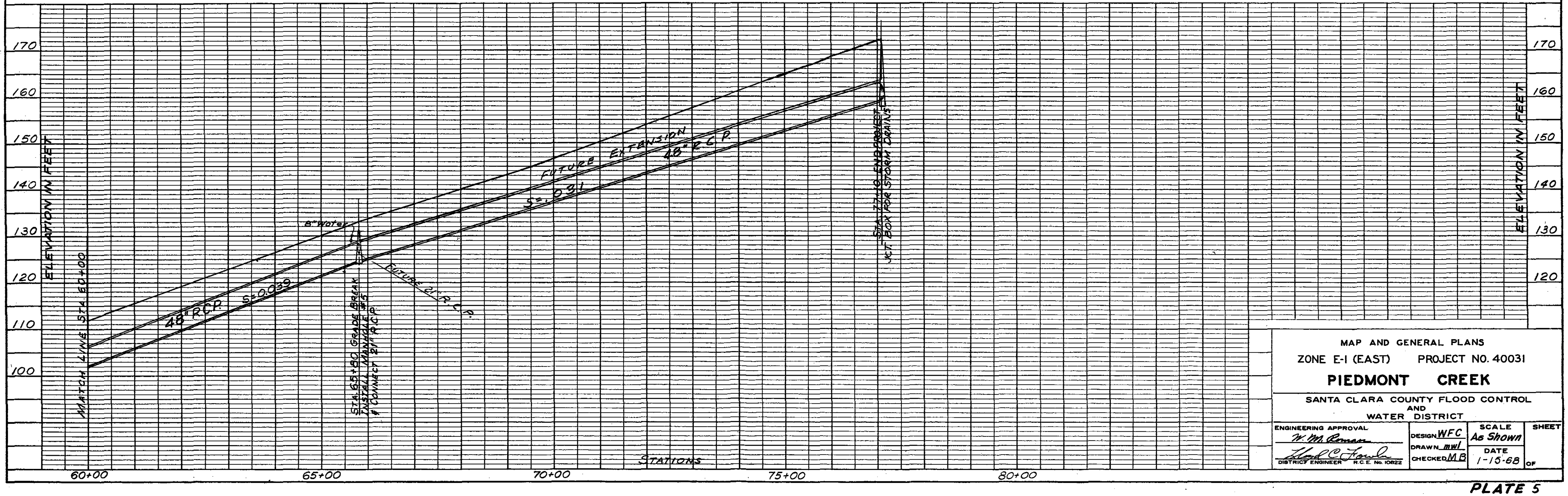
DATE
1-15-68

SHEET
OF

PLATE 4



NOTE: DEBRIS BASINS TO BE INSTALLED AT UPSTREAM INLET OF STORM DRAINS



MAP AND GENERAL PLANS

ZONE E-I (EAST) PROJECT NO. 40031

PIEDMONT CREEK

SANTA CLARA COUNTY FLOOD CONTROL
AND
WATER DISTRICT

ENGINEERING APPROVAL W. M. Roman Lloyd C. Fowler DISTRICT ENGINEER R.C.E. No. 10822	DESIGN WFC DRAWN mwl CHECKED MB	SCALE As Shown DATE 1-15-68	SHEET OF

PLATE 5